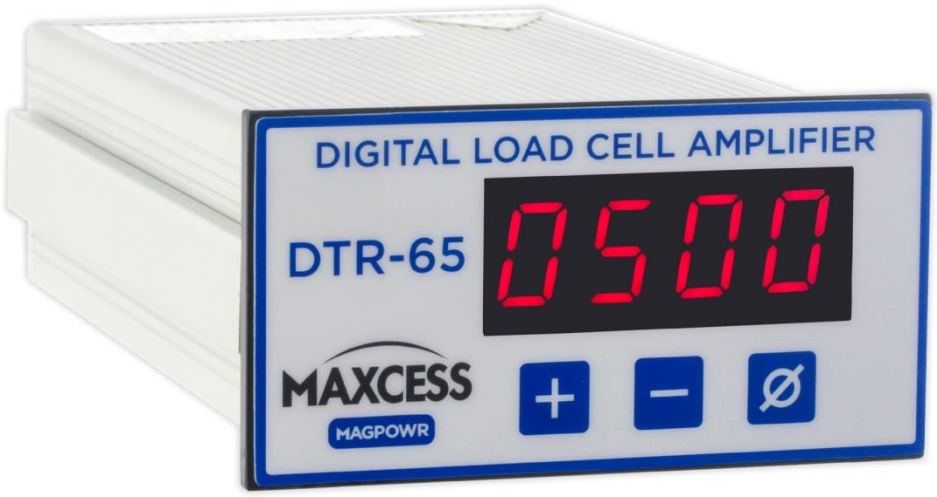
MAXCESS

MAGPOWR

MAGPOWR DTR-65
Digital Load Cell Amplifier
Installation and User Manual



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About these operating instructions

All of the information herein is the exclusive proprietary property of Maxcess International, and is disclosed with the understanding that it will be retained in confidence and will neither be duplicated nor copied in whole or in part nor be used for any purpose other than for which disclosed.

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Periodically there will be updates to this manual. The latest version is available at www.maxcessintl.com or by calling your regional office listed on the back page of this publication.

These digital load cell amplifiers must not be installed or used in a machine or system which does not comply with the machinery directive 2006/42/EC.

These digital load cell amplifiers were designed and manufactured to be installed as Partly Completed Machinery into a machine or partly completed machine.

The instructions must be read and used by all persons who have the responsibility of installing and maintaining this digital load cell amplifier.

These instructions must be retained and incorporated in the technical documentation for the machine or partly completed machinery into which the digital load cell amplifier is installed.

CE marking

This digital load cell amplifier is marked with the CE sign according to the EMC directive 2004/108/EC and the low voltage directive 2006/95/EC.

Conventions used in this manual

All dimensions and specifications are shown in the format mm [inches] unless specified otherwise.

Language

These are the original instructions, written in English.

Product overview

The DTR-65 is a digital tension readout and amplifier which provides excitation voltage for load cells and amplifies the returned millivolt signal which is proportional to applied force into a 0 to 10 V, 4 to 20 mA, and a 0 to 1mA signal. The DTR-65 shows the signal converted into a digital readout in engineering units representing applied force.

The DTR-65 is panel mounted and provides IP65 protection on the front face and IP20 protection on the back and sides. The IP65 protection is provided by a gasket and a membrane keypad.

All calibrations and setup are entered using a keypad and a 4-digit display. Tension is displayed using three significant digits. The DTR-65 has a front panel tension zero button and a digital input to remotely zero tension.

The DTR-65 has an alarm output which can be programmed to activate at either a high or low tension threshold. Load cell diagnostics run during power-up.

Model number key

The model number and serial number are shown on the bottom of the enclosure.

The model number consists of the base model "DTR-65" followed by optional alphanumeric characters.

Model format: DTR-65

Serial number format: MMDDYYNNNL

MM = month

DD = day

YY = last two digits of the year

NNN = a sequence number

L = manufacturing location

Instructions for use

To ensure safe and problem free installation of the digital load cell amplifier, the digital load cell amplifier must be properly transported and stored, professionally installed and placed in operation. Proper operation and maintenance will ensure a long service life of the device. Only persons who are acquainted with the installation, commissioning, operation and maintenance of the system and who possess the necessary qualifications for their activities may work on the digital load cell amplifier. Note: The safety information may not be comprehensive.

Please note the following:

- The content of these operating instructions
- Any safety instructions on the device
- The machine manufacturer's specifications
- All national, state, and local requirements for installation, accident prevention and environmental protection

Safety symbols

Information about safety symbols

The safety instructions and symbols described in this section are used in these operating instructions. They are used to avoid possible dangers for users and to prevent material damage.

SIGNAL WORD
Source of danger and its results
Avoiding dangers

The signal word **DANGER** refers to the danger of death or serious bodily injuries.
The signal word **WARNING** refers to the danger of moderate to severe bodily injuries.
The signal word **CAUTION** refers to the danger of slight to moderate bodily injuries or material damage.
The signal word **NOTICE** refers to the possibility of damage to equipment.

Symbols used

The following safety identification symbols are used in these operating instructions.

WARNING/CAUTION – General danger or important note
Reference to general hazards that may result in bodily injuries or damage to device or material.

WARNING/CAUTION – Danger due to crushing
Reference to danger of injury caused by crushing.

WARNING/CAUTION – Danger due to cutting
Reference to danger of injury caused by cutting.

WARNING/CAUTION – Danger due to voltage, electric shock
Reference to danger of injury caused by electric shock due to voltage.

WARNING/CAUTION – Danger due to hot surfaces
Reference to risk of injury caused by burning.

Basic safety information

Proper use

The digital load cell amplifier is intended to be used on machines or systems to amplify the signal from MAGPOWR or competitor load cells.

Indoor operation, see environmental specifications.

Improper use

Operation outside the technical specifications

Operation in an Ex-area or intrinsically safe area

Outdoor operation

Any other use than the proper use shall be deemed inappropriate

Installation and commissioning

Any digital load cell amplifier which is damaged must not be installed or put into operation.

Only perform installation, maintenance or repair tasks on the digital load cell amplifier when the machine into which the DTR-65 is installed has been stopped and is secured from being turned on.

Only perform installation, maintenance or repair tasks on the digital load cell amplifier when there is no electrical power in the system.

The digital load cell amplifier must be securely mounted before being placed in operation.

Only replacement parts obtained from Maxcess may be used.

No modifications may be made to the digital load cell amplifier.

Do not place electrical cables under mechanical strain.

continued

Basic safety information

continued

WARNING – Shock may result from water or conductive particles entering the DTR-65 enclosure due to poor gasket sealing on the front panel.

To maintain the IP65 rating on the front panel, be sure the gasket is properly seated between the DTR-65 front panel and the panel into which the DTR-65 is installed.

WARNING – Death or injury can result from unexpected movement of the machine into which the DTR-65 is installed.

Protect against unexpected movement by removing electrical power from the digital load cell amplifier and the machine into which the digital load cell amplifier is being installed.

WARNING – Death or injury from shock may result from wiring live power to the DTR-65.

Be sure the power is turned off and locked out before wiring the DTR-65.

WARNING – Death or injury can result from electric shocks.

Safety requirements require a connection between the DTR-65 earth ground and the PE circuit of the building or machine.

continued

Basic safety information
continued

Operation

None, as tasks from the operator are generally not required.

Maintenance and repair

WARNING – Death or injury can result from unexpected movement of the machine into which the DTR-65 is installed. Protect against unexpected movement by removing electrical power from the digital load cell amplifier and the machine into which the digital load cell amplifier is installed.

WARNING – Danger of injury from crushing.
Maintenance and repair tasks on the digital load cell amplifier must be performed only when the machine into which the DTR-65 has been installed has been stopped and has been secured from being turned on again.

WARNING – Death or injury from shock may result from wiring live power to the DTR-65.
Be sure the power is turned off and locked out before wiring the DTR-65.

Decommissioning

The digital load cell amplifier must be disposed of in accordance with all the applicable national, state and local regulations.

Mechanical installation

WARNING – Death or injury can result from unexpected movement of the machine into which the DTR-65 is installed.

Protect against unexpected movement by removing electrical power from the digital load cell amplifier and the machine into which the digital load cell amplifier is installed.

WARNING – Danger of injury from crushing.

Maintenance and repair tasks on the digital load cell amplifier must be performed only when the machine into which the DTR-65 is installed has been stopped and has been secured from being turned on again.

WARNING – Shock may result from water or conductive particles entering the DTR-65 enclosure due to poor gasket sealing on the front panel.

To maintain the IP65 rating on the front panel, be sure the gasket is properly seated between the DTR-65 front panel and the panel into which the DTR-65 is installed.

Mechanical installation

continued

1. Remove the panel jacks from the back of the DTR-65.
2. Install the DTR-65 into a standard 1/8 DIN cut-out 92 x 45 [3.62 x 1.77] (Figure 1). Make sure the gasket is between the DTR-65 front panel and the panel into which the DTR-65 is being installed to maintain the IP-65 rating on the DTR-65 front panel (Figure 2, page 3-3).

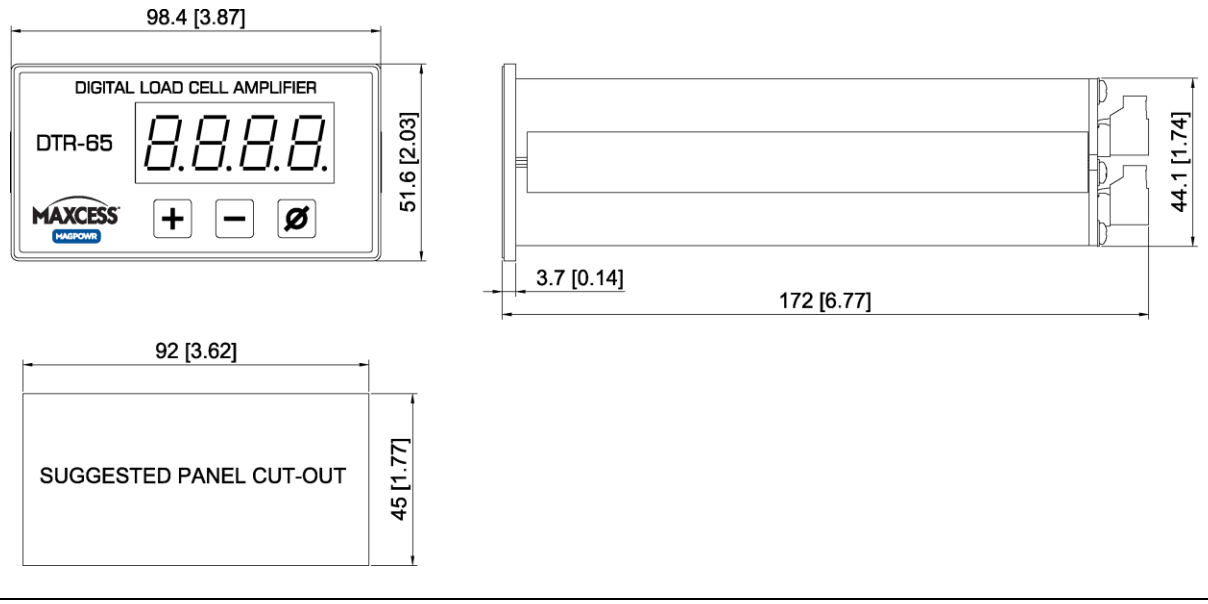


Figure 1. DTR-65 dimensions.

continued

Mechanical installation

continued

3. Reinstall the panel jacks from the back of the DTR-65 into the panel jack grooves in the side of the enclosure.
4. Install the set screws into the panel jack grooves and tighten with the supplied allen wrench to secure the DTR-65 in the panel and to form a seal on the gasket. Tighten the set screws to a torque of 0.099 to 0.113 Nm [14 to 16 oz. in.].

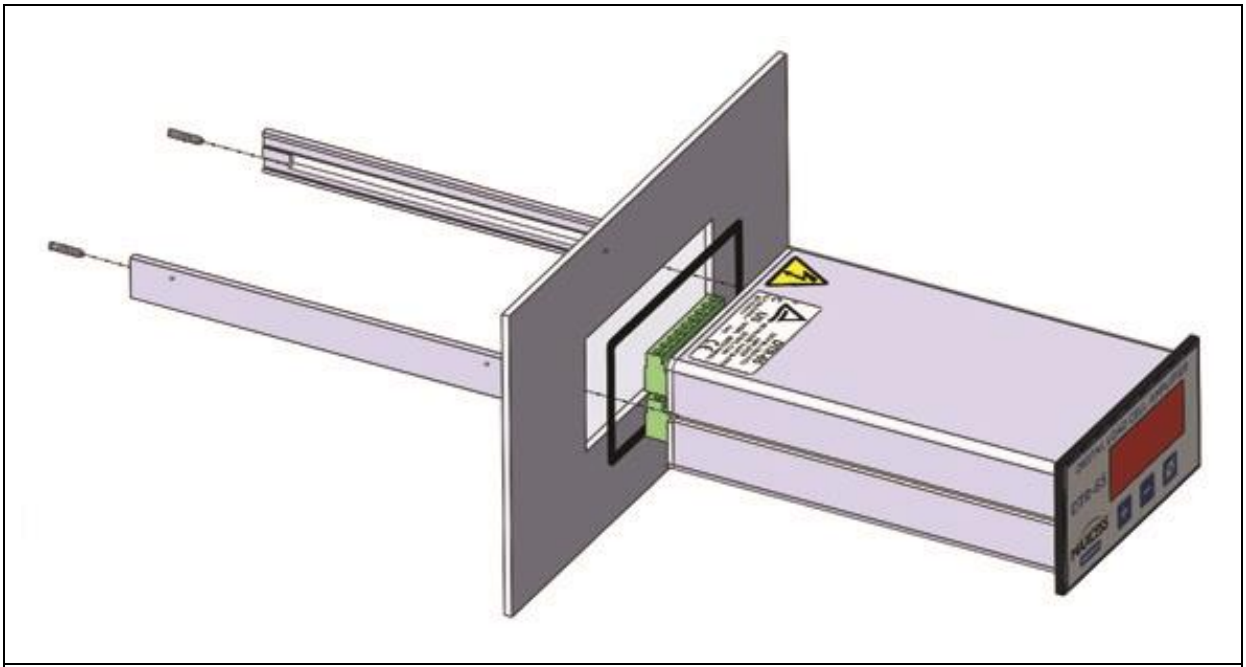


Figure 2. Installation of the DTR-65 into a panel.

Electrical installation

WARNING – Death or injury from shock may result from wiring live power to the DTR-65.

Be sure the power is turned off and locked out before wiring the DTR-65.

All wiring must comply with the essential requirements of the appropriate standard(s) and is the responsibility of the installer.

For fixed/permanent installation of the DTR-65, a suitable switch or circuit-breaker must be installed as a disconnecting device and this switch/circuit-breaker needs to be labelled appropriately.

Wiring to the digital load cell amplifier must be insulated copper wire with a temperature rating of at least 80ºC. The wire size must be at least 0.34 mm^2 (22 AWG). Use twisted pair cable for the power. Use shielded cable for the load cell and analog output wiring.

The DTR-65 can be powered by either 100-240 VAC 50-60 Hz or by 24 VDC. Only connect to one power source.

Electrical installation

continued

See Figure 3 for reference.

1. Connect power to the DTR-65. Only one power source is needed.
   For 100-240 VAC power
   Connect 100-240 VAC to TB1 pins 1and 2 labeled AC L1 and AC L2.
   For 24 VDC power
   Connect a 24 VDC power supply to TB1 pins 4 and 5. Pin 4 should be positive.
2. Connect the PE of the building or machine to TB1 pin 3 marked with the earth ground symbol.

   Note: The negative power connection, TB1 pin 5, is internally connected TB1 pin 3. This connection is used for EMC compliance. TB1 pin 3 is also connected to all the terminals labeled with SHLD which are TB1 pin 10, TB2 pins 5 and 6. TB1 pin 5 is also connected to all the terminals labeled GND, TB1 pin 11, and TB2 pins 3 and 8.

WARNING – Death or injury can result from electric shocks. Safety requirements require a connection between the DTR-65 earth ground and the PE circuit of the building or machine.

CAUTION – Never place electrical cables under mechanical strain. Always provide mechanical support of wiring with either clamps or flexible or rigid conduit.

3. Connect one or two load cells to TB1 pins 6, 7, 8, and 9. See Figure 3. If using non-MAGPOWR half-bridge load cells, see Figure 4 for wiring.
4. Calibrate the load cells by following the procedure starting on page 4-5 (Precision) or 4-8 (Weightless).

Figure 3 on the next page shows the complete DTR-65 wiring.

Note: When using the AC supply input TB1 pin 4 does not output +24 VDC. This pin is a power input only.

Wiring for the DTR-65

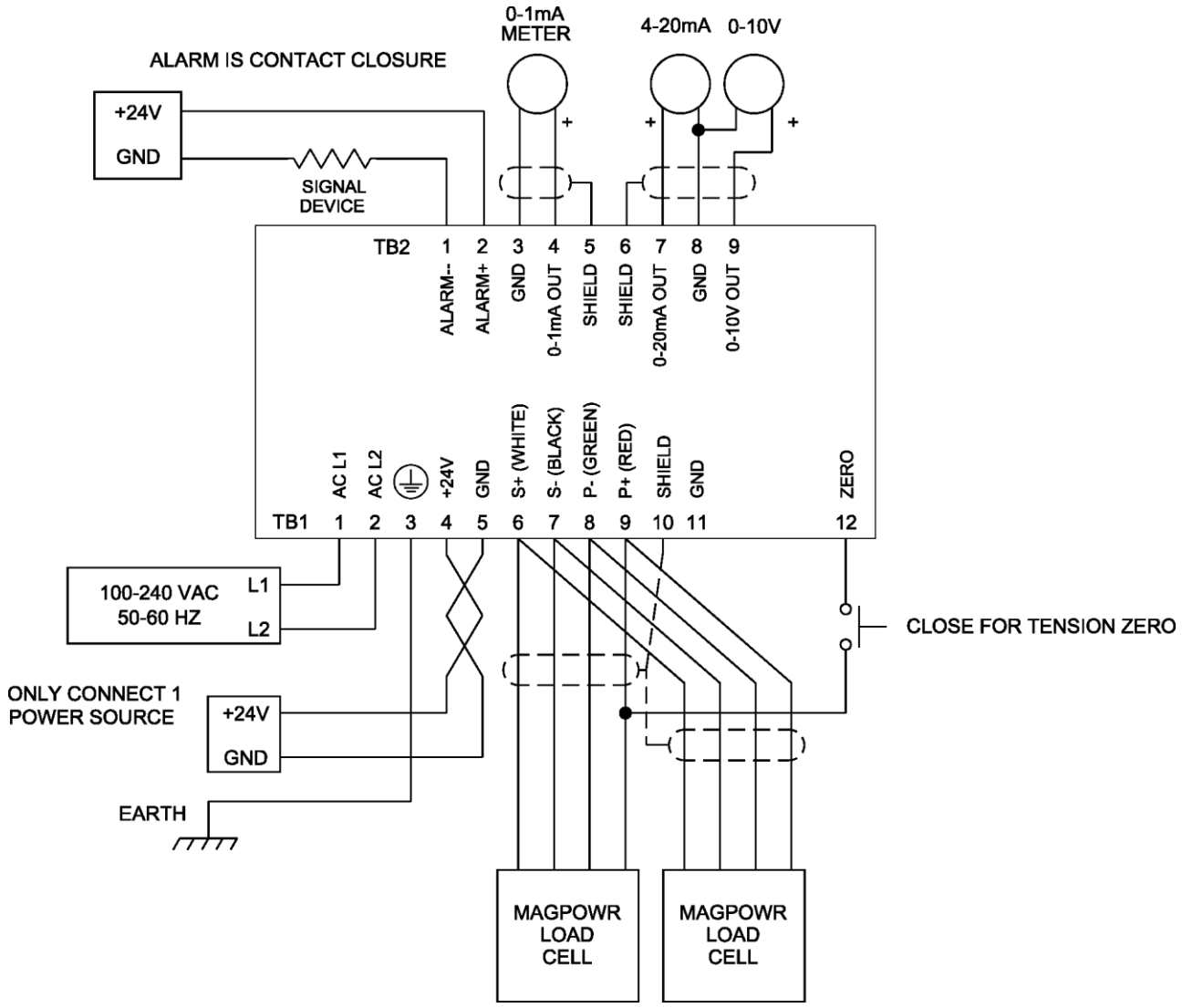


Figure 3. Complete DTR-65 wiring.

Wiring for the DTR-65

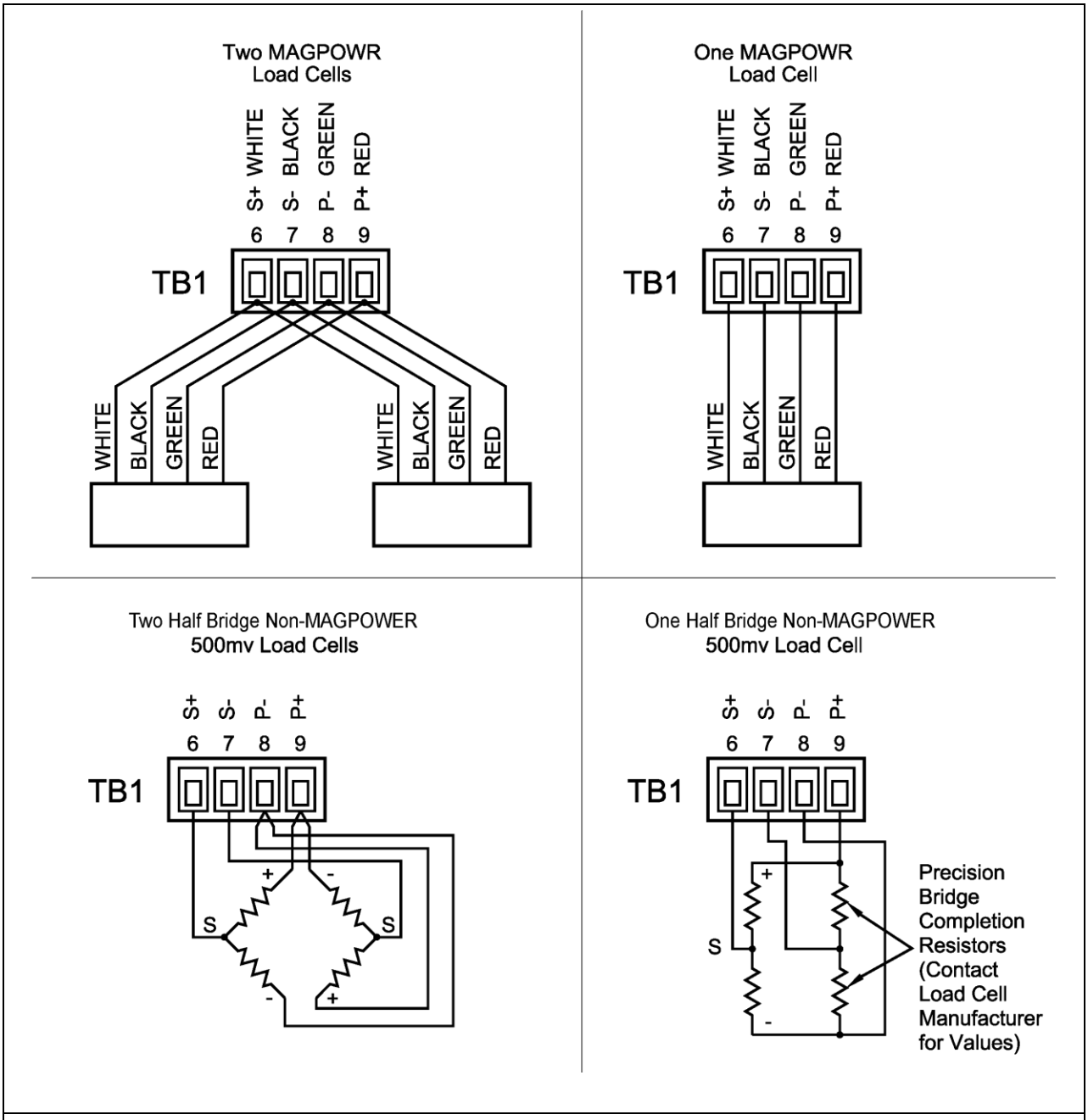


Figure 4. Load cell wiring detail.

Convert wiring from LCA to DTR-65

Table 1 shows how to convert the wiring from an LCA to the DTR-65.

Function	LCA Terminal	DTR-65 Terminal
+24 V	12	TB1-4
Gnd	11	TB1-5
⏚ Earth Ground	10	TB1-3
0 to 1 mA	9	TB2-4
4 to 20 mA	8	TB2-7
Gnd	7	TB2-8
0 to 10V	6	TB2-9
Shield	5	TB2-5, TB2-6, TB1-10
P+	4	TB1-9
P-	3	TB1-8
S-	2	TB1-7
S+	1	TB1-6

Table 1. Convert wiring from LCA to the DTR-65.

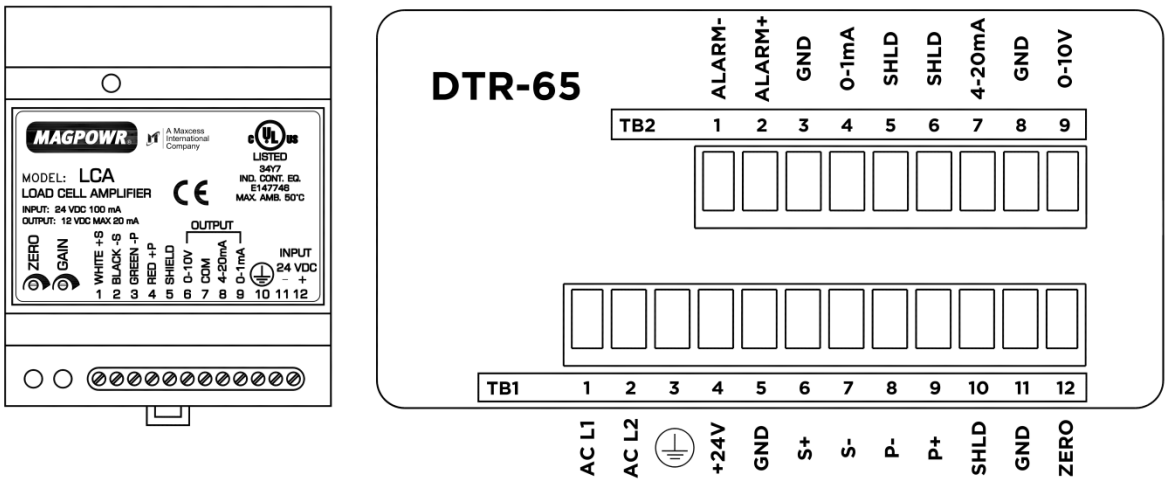


Figure 5. LCA and DTR-65 pinout.

Convert wiring from DTR to DTR-65

Table 2 shows how to convert the wiring from a DTR to the DTR-65.

Function	DTR Terminal	DTR-65 Terminal
AC L1	L1	TB1-1
AC L2	L2	TB1-2
Earth Ground	None	TB1-3
Gnd	GND	TB2-8
0 to10V	+OUT	TB2-9
Shield	None	TB2-5, TB2-6, TB1-10
P+	+P RED	TB1-9
P-	-P GRN	TB1-8
S-	-S BLK	TB1-7
S+	+S WHT	TB1-6

Table 2. Convert wiring from a DTR to the DTR-65.

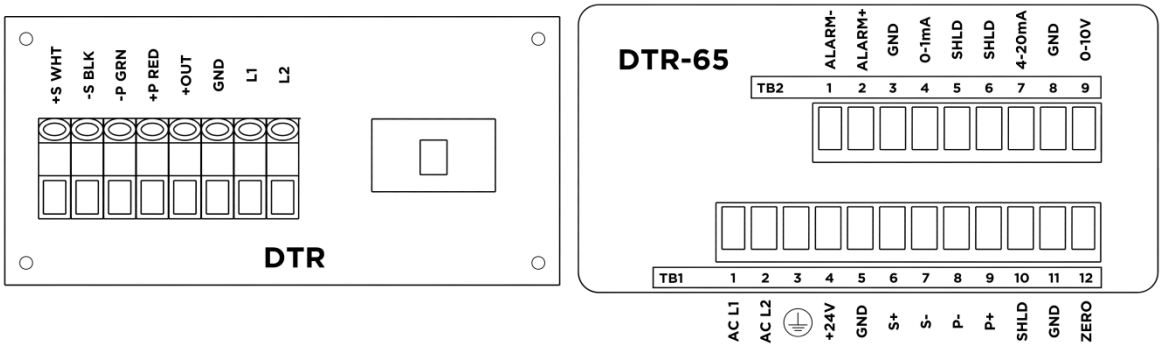


Figure 6. DTR and DTR-65 pinout.

Operation

DTR-65 control buttons

There are three manual control buttons on the DTR-65.

[+] = increment

[–] = decrement

[∅] = zero tension, or enter or save function

Power on

The DTR-65 will display the software version number when power is first applied for five seconds and then the DTR-65 will start displaying the tension. During the software version display, diagnostics are performed on the load cells and any errors are displayed.

The load cell diagnostic errors are shown in Table 3.

To exit from the load cell diagnostic error, press [∅] and the tension will be displayed.

If no errors are detected, the tension will be displayed.

Display	Meaning
Er 10	Sensor White (S+) or Black (S–) wire disconnected.
Er 11	Sensor Red (P+) wire disconnected.
Er 12	Sensor Green (P–) wire disconnected.
Er 13	Sensor Failure or other miswiring error. Example: Green and White wire are swapped, etc.

Table 3. Load cell diagnostic errors.

Zeroing tension display

While displaying tension, press [∅] for two seconds to zero the displayed tension and output.

Connecting the digital input (Zero) to either +5V or +24V for greater than 500 ms will zero the displayed tension and output.

This function will work only when the following conditions are met:

- when displaying tension and not if in the parameter menu,
- when not in calibration,
- if zeroing has not been locked out when a password has locked the DLCA.

Reset parameters to defaults

Press and hold [+] and [∅] while turning power on to the DTR-65. The display will show "dEF" for four seconds while the parameters are reset to defaults.

This does not reset the calibrate analog output parameters C0.1 through C0.6. These parameters are calibrated at the factory for the component tolerances on each board. The password is reset and the DTR-65 will be unlocked.

Tension over-range

The tension reading display will flash when the displayed tension exceeds the maximum tension set in either parameter C1.3 or C2.5.

Password protection

The DTR-65 allows a password to be set which prevents changes to the parameters or performing a calibration. When locked, all parameters can be viewed. Only zeroing tension is allowed while the password has locked the DTR-65, unless zeroing has been locked out.

Programming mode

Enter the programming menu

Press and hold [+] and [–] for two seconds.

Exit the programming menu

Press and hold [+] and [–] for two seconds.

Also: While showing parameter P.24, you may press [∅] to exit the menu and return to displaying the tension.

Parameter number

While in the programming mode, the display shows **P.xx**, where **xx** is the parameter number.

Press [+] or [–] to increment or decrement the parameter number. Press [∅] to enter the data entry mode for a parameter. Use [+] or [–] to change the value of a parameter. Press [∅] and release to cancel the data change and return to the menu. Press [∅] and hold for two seconds (until the display starts flashing) to save the changed parameter. If the data has been changed and the data has not been saved, after five seconds of no button activity the display will flash indicating the data needs to be saved.

The CAL1 and CAL2 menus are sub-menus which are used to step the operator through the calibration sequence. Press [∅] when a CALx menu is showing to get into the sub-menu. The parameters will now be labeled Cx.y.

continued

Programming mode

Parameter number

continued

When in the programming mode and no buttons have been pressed for two minutes, the DTR-65 exits the programming mode and returns to displaying tension. This menu time-out is not active once any of the calibration loops have been entered.

The DTR-65 allows a password to be set which prevents changes to the parameters or performing a calibration. When locked, all parameters can be viewed. Only zeroing tension is allowed while the password has locked the DTR-65, unless zeroing has been locked out.

Tension calibration

The DTR-65 allows either precision calibration or weightless calibration. The Precision Calibration method is described below. Weightless Calibration begins on page 4-8.

Calibration can only be performed when the password has not locked the DTR-65. To unlock the DTR-65, see the Password parameter P.00 on page 5-4.

Precision calibration

Use this method when applying a known weight with a rope in the web path to the load cells for calibration. Typically this should be 10% of the load cell rating or greater.

Enter the programming mode by pressing and holding [+] and [-] for two seconds.

Use the [+] and/or [-] buttons to go to parameter P.01. Press [∅] to see the present load cell excitation voltage. Select either 5V or 7.5V. When using MAGPOWR load cells select 7.5V. Press and hold [∅] for two seconds (until the display starts flashing) to store the changes.

Use the [+] and/or [-] buttons to go to "CAL1". Press [∅] to enter the CAL1 sub-menu.

Display now shows C1.1. Unload the load cell roller and press [∅]. The DTR-65 will now zero out the idler roll weight and show a wait display. After zeroing, the DTR-65 will automatically increment to the next parameter.

continued

Tension calibration

Precision calibration
continued

Display now shows C1.2. Press [∅] and select the decimal point position for tension. Press and hold [∅] for two seconds (until the display starts flashing) to store the decimal point position chosen. Range {0000, 0000., 000.0, 00.00, 0.000}.

Display now shows C1.3. Press [∅] and enter the maximum tension. Press and hold [∅] for two seconds (until the display starts flashing) to store the parameter. This value scales the output. The output will be at 10 volts or 20 mA when the measured tension matches this value. The maximum output voltage or current is set by parameters P.07, P.09, and P.11. Range {0, 9990}.

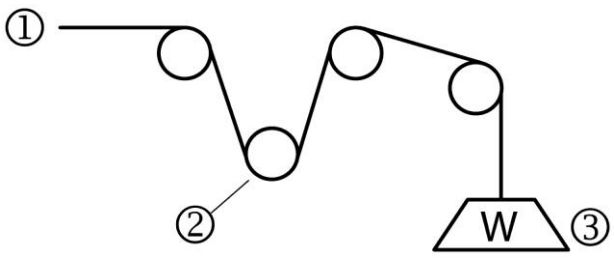
Display now shows C1.4. Press [∅] and enter the calibration tension that will be applied to the load cell. Press and hold [∅] for two seconds (until the display starts flashing) to store the parameter. Range {0, 9990}.

continued

Tension calibration

Precision calibration
continued

Display now shows C1.5. Apply the calibration load to the load cell using a temporary web or rope and a known weight entered in C1.4. The temporaray web should follow the normal web path. When using a rope, the rope should be centered on the rollers. See Figure 7. Press [∅] to start calibration. The display will show a wait screen, and then display PASS for a successful calibration or an error code to indicate an issue with the calibration.



1	Temporary web
2	Sensing roll
3	Weight (W)

Figure 7. Apply calibration tension.

From either the passing or error screen, press [∅] to return to displaying tension.

See the calibration errors in Table 4 on page 4-11.

Tension calibration

Weightless calibration

Use this method when applying a known weight is not convenient or desired.

For Precision Calibration method, see page 4-5.

Enter the programming mode by pressing and holding [+] and [-] for two seconds.

Use the [+] and/or [-] buttons to go to parameter P.01. Press [∅] to see the present load cell excitation voltage. Select either 5V or 7.5V. When using MAGPOWR load cells select 7.5V. Press and hold [∅] for two seconds (until the display starts flashing) to store the changes.

Use the [+] and/or [-] buttons to go to CAL2. Press [∅] to enter the CAL2 sub-menu.

Display now shows C2.1. Unload the load cell roller and press [∅]. The DTR-65 will now zero out the idler roll weight and show a wait display. After zeroing the DTR-65 will automatically increment to the next parameter.

Display now shows C2.2. Press [∅] and select the decimal point position for tension. Press and hold [∅] for two seconds (until the display starts flashing) to store the decimal point position chosen. Range {0000, 0000., 000.0, 00.00, 0.000}.

Display now shows C2.3. Press [∅] and enter the load cell sensitivity in mV/V units. MAGPOWR load cells have a sensitivity of 2.1 mV/V. (Consult the manual of competitor's load cells if using non-MAGPOWR load cells.) Press and hold [∅] for two seconds (until the display starts flashing) to store the parameter. Range {000.1, 100.0}.

continued

Tension calibration

Weightless calibration

continued

Display now shows C2.4. Press [∅] and enter the combined load cell rating. Press and hold [∅] for two seconds (until the display starts flashing) to store the parameter. Range {0, 9990}.

Display will now show C2.5. Press [∅] and enter the maximum tension. Press and hold [∅] for two seconds (until the display starts flashing) to store the parameter. This value scales the output. The output will be at 10 volts or 20 mA when the measured tension matches this value. The maximum output voltage or current is set by parameters P.07, P.09, and P.11. Range {0, 9990}.

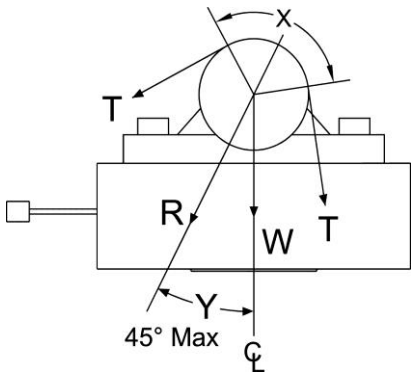


Figure 8. Weightless calibration angles.

X = Web wrap angle
Y = Angle from force direction Arrow

Continued

Tension calibration

Weightless calibration
continued

Display now shows C2.6. Press [∅] and enter the web wrap angle in degrees. This is the angle over which the web touches the idler roller. Press and hold [∅] for two seconds (until the display starts flashing) to store the parameter. Refer to Figure 8 for the wrap angle 'X'. Range {0, 180.0}.

Display now shows C2.7. Press [∅] and enter the angle from the force direction arrow or center line in degrees. This is the angle between the resultant force from the web tension and the force direction arrow of the load cell or centerline of the load cell. The maximum value is 45 degrees. Press and hold [∅] for two seconds (until the display starts flashing) to store the parameter. Refer to Figure 8 for the angle from force direction 'Y'. Range {00.0, 45.0}.

Display now shows C2.8. Press [∅] to start the weightless calibration. The display will show a wait screen, and then display PASS for a successful calibration or an error code to indicate an issue with the calibration.

From either the passing or error screen press [∅] to return to displaying tension.

See the calibration errors in Table 4 on page 4-11.
If the displayed tension reads negative when force is applied to the load cell, change parameter P.20 (Tension Polarity), to -1. The displayed tension will now read positive when force is applied.

Tension calibration errors

Display	Error description
PASS	Calibration was successful. No Errors found.
Er 1	Signal read by the amplifier is too large when maximum tension is applied. This is caused by maximum tension being too large. Reduce maximum tension.
Er 2	Signal read by the amplifier is too small. Too little of the load cell range is being used, thus the gain is greater than 32:1. Use more of the load cell range or set maximum tension higher.
Er 3	Roller weight too large. Roller weight exceeds 90% of the load cell rating. Make roller weight smaller.
Er 4	Calibration tension is greater than Maximum tension. Make Maximum tension larger than Calibration tension.
Er 5	Maximum tension exceeds the load cell rating. Lower wrap angle, make roll weight smaller or get higher rated load cells.

Table 4. Load cell calibration errors.

Entering maximum tension

Examples

The following are examples of displaying tension that results from the value entered for maximum tension and the selection of the decimal point position. The DTR-65 displays tension with three significant digits.

Example 1

Using two GTSD-15000M load cells:

- The rated load is 30000 kg.
- The application's maximum tension is 15000 kg.
- Enter decimal point position as **000.0.**
- Enter Maximum tension as 15.0.
- The DTR-65 now displays tension with units of 1000 kg.
- The display will increment in 100 kg steps.

Same application but desired units are Newtons:

- The load cell's rated load is 294 kN.
- The application's maximum tension is 147 kN.
- Enter decimal point position as **0000.**
- Enter Maximum tension as 147.
- The DTR-65 now displays tension with units of 1 kN.
- The display will increment in 1 kN steps.

Same application but desired units are Pounds:

- The load cell's rated load is 66.1 kPounds.
- The application's maximum tension is 33.0 kPounds.
- Enter decimal point position as **000.0.**
- Enter maximum tension as 33.0.
- The DTR-65 will now display tension with units of 1 kPound.
- The display will increment in 0.1 kPound steps.

Entering maximum tension

continued

Example 2

Using two GTSB-2200 load cells:

- The rated load is 4400 lbs.
- The application's maximum tension is 2000 lbs.
- Enter decimal point position as **00.00.**
- Enter Maximum tension as 2.00.
- The DTR-65 now displays tension with units of 1000 lbs.
- The display will increment in 10 lb steps.

Alternatively:

- Enter decimal point position as **0000.**
- Enter maximum tension as 2000.
- The DTR-65 will now display tension with units of 1 lbs.
- The display will increment in 10 lb steps.
- Note that the right-most zero is fixed and does not change.

Parameters

Filtering

The tension display and all 3 analog outputs have a separate low pass filter. The filter response can be set from 100 Hz to 0.01 Hz.

Parameter #	Description	Units	Default	Range
P.02	Tension display filter frequency	Hertz	3	{00.01, 99.99}
P.03	0 to 10V output filter frequency	Hertz	40	{00.01, 99.99}
P.04	4 to 20mA output filter frequency	Hertz	40	{00.01, 99.99}
P.05	0 to1mA output filter frequency	Hertz	40	{00.01, 99.99}

Analog output scaling

Each analog output's output values for zero tension and maximum tension can be set by the following parameters.

Parameter #	Description	Units	Default	Range
P.06	Sets the 0 to 10V output voltage when the tension is 0.	volts	0	{00.00, 10.00}
P.07	Sets the 0 to 10V output voltage when the tension is equal to maximum tension	volts	10	{00.00, 10.00}
P.08	Sets the 4 to 20mA output current when the tension is 0. Allows changing to a 0 to 20 mA output	milliamps	4	{00.00, 20.00}
P.09	Sets the 4 to 20mA output current when the tension is equal to maximum tension	milliamps	20	{00.00, 20.00}
P.10*	Sets the 0 to 1mA output current when the tension is 0	volts	0	{00.00, 10.00}
P.11*	Sets the 0 to 1mA output current when the tension is equal to maximum tension	volts	10	{00.00, 10.00}

* The voltage value entered in P.10 and P.11 represents the current value in milliamps when divided by 10.

Alarm setup and operation

The following parameters describe the setup and operation of the alarm output.

Parameter #	Description	Default	Range
P.13	Sets the alarm activation type. 0 = Alarm ON when tension is above the alarm high compare value 1 = Alarm ON when tension is below the alarm low compare value. 2 = Alarm ON when tension is either above the alarm high compare value or below the alarm low compare value. 3 = Alarm ON when tension is below the alarm high compare value and above the alarm low compare value.	0	{0, 3}
P.14	Alarm high compare value	500	{0, 9990}
P.15	Alarm low compare value	0	{0, 9990}
P.16	Alarm hysteresis percent [Hysteresis percent is a percentage of maximum tension (value in C1.3 or C2.5).]	0	[000.0, 100.0}
P.17	Alarm ON delay time [The alarm ON output is delayed by this number of seconds.]	0	{00.00, 99.99}
P.18	Alarm OFF delay time [The alarm OFF output is delayed by this number of seconds.]	0	[00.00, 99.99}

Alarm operation with hysteresis

Alarm activation type 0:

Alarm turns on when tension is greater than High value.
Alarm turns off when tension is less than (HighValue – (HysteresisPercent * MaximumTension))

Alarm activation type 1:

Alarm turns on when tension is less than Low value.
Alarm turns off when tension is greater than (LowValue + (HysteresisPercent * MaximumTension))

Alarm activation type 2:

Alarm turns on when tension is greater than High value or less than Low value.
Alarm turns off when tension is less than (HighValue – (HysteresisPercent * MaximumTension)) and when tension is greater than (LowValue + (HysteresisPercent * MaximumTension))

Alarm activation type 3:

Alarm output is the complement of alarm activation type 2.

Digital input threshold

Parameter #	Description	Default	Range
P.12	Sets the digital input threshold for either 5V or 24V operation. When set for 5V, the threshold between on and off is 2.5 volts with 20% hysteresis. When set for 24V, the threshold between on and off is 12 volts with 20% hysteresis.	24 volts	n/a

Calibrate the analog outputs (not normally changed)

CAL0 – These parameters set the offset and gain for the outputs to calibrate the outputs to real volts or real current. The parameters compensate for component tolerances on each DTR-65. These parameters are calibrated at the factory and are not reset by the power-up function reset parameters to default.
If these need to be changed connect a volt meter or current meter as appropriate to the output that is being calibrated.

Parameter #	Description	Range
C0.1	Sets the 0 to 10V output to 0%. Change the value until the meter reads 0.00 volts	{0, 9999}
C0.2	Sets the 0 to 10V output to 100%. Change the value until the meter reads 10.00 volts	{0, 9999}
C0.3	Sets the 4 to 20mA output to 0%. Change the value until the meter reads 0.00 milliamps.	{-999, 9999}
C0.4	Sets the 4 to 20mA output to 100% Change the value until the meter reads 20.00 milliamps	{0, 9999}
C0.5	Sets the 0 to 1mA output to 0%. Change the value until the meter reads 0.00 volts or 0.00 milliamps	{0, 9999}
C0.6	Sets the 0 to 1mA output to 100%. Change the value until the meter reads 10.00 volts or 1.00 milliamps.	{0, 9999}

Password

Parameter #	Description	Range
P.00	Password When the DTR-65 is locked, all parameters will be viewable but cannot be changed and no calibrations can be performed. To lock or unlock the DTR-65 press [∅] to show the lock or unlock status, displayed as ULOC for unlocked and LOC for locked. To lock the DTR-65 the password must be entered twice. To unlock the DTR-65 the password only needs to be entered once. **To lock the DLCA** Press [∅] again and the display will show PAS1, press [∅] and enter the password using the [+] and [-] buttons. Press and hold [∅] for two seconds to enter the password. The display now shows PAS2. Press [∅] and enter the same password using the [+] and [-] buttons. Press and hold [∅] for two seconds to enter the password. The display now shows LOC for locked. Press [∅] to return to displaying tension. **To unlock the DLCA** Press [∅] again and the display shows PAS1. Press [∅] and enter the password using the [+] and [-] buttons. Press and hold [∅] for two seconds to enter the password. The display now shows ULOC if the correct password was entered. Press [∅] to return to displaying tension. If the password was incorrect, the display shows LOC and the DTR-65 is still locked. Press [∅] to return to displaying tension, and then repeat the unlock procedure.	{0, 9999}

Miscellaneous		
Parameter #	Description	Default
P.19	Tension number format Tells whether tension display is 3-digit with no fixed right-hand zero or 3-digit with fixed right-hand zero. 0 = Auto Select between formats. (Based on value in Maximum Tension C1.3 or C2.5). 1 = 3-digit with no fixed right-hand zero. 2 = 3-digit with fixed right-hand zero.	0
P.20	Tension polarity Set to -1 to show positive tension when the force is acting in the direction opposite the force direction arrow on the load cells. Set automatically by Precision calibration.	+1
P.21	DP position Set the decimal point position to show when displaying tension 0 = 0000 1 = 0000. 2 = 000.0 3 = 00.00 4 = 0.000	0
P.22	Lock out zeroing tension from [∅] button and digital input when a password has locked the DLCA. 0 = Zeroing tension allowed when password has locked the DLCA 1 = Zeroing tension locked out when password has locked the DLCA	0
P.23	Firmware Version. Displays the firmware version.	
P.24	Exit from menu and return to displaying tension	

Maintenance

No regular maintenance is required on the DTR-65.

Fuse replacement

There are four fuses in the DTR-65. To access:

1. Remove the DTR-65 from the panel.
2. Remove the four corner pan head screws on the DTR-65 back panel.
3. Carefully slide out the board assembly until all four fuses are visible. **Do not remove the board assembly farther than this point.**

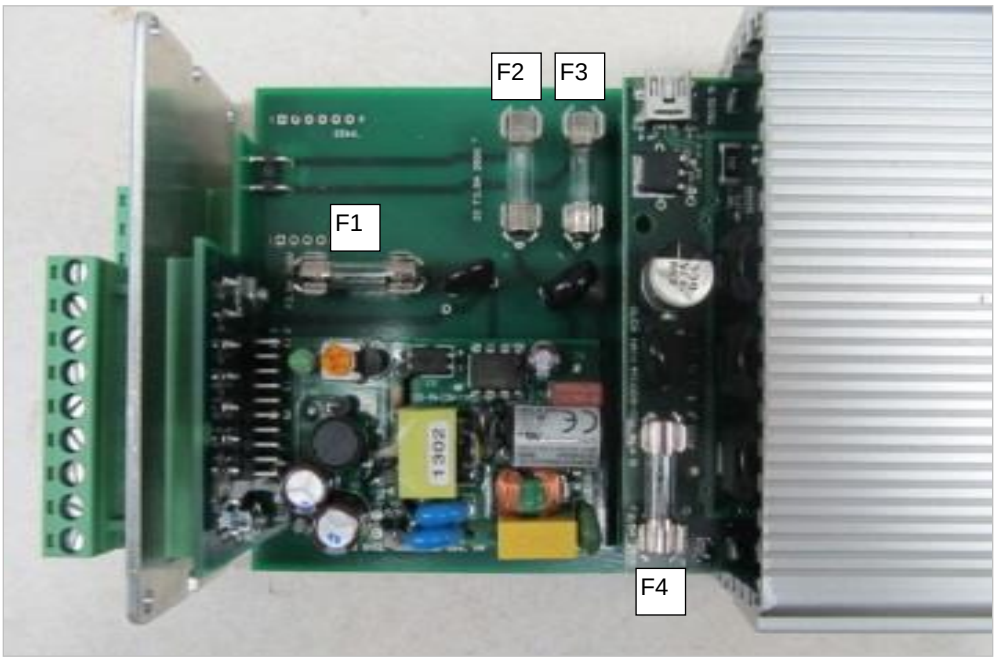


Figure 9. Access to the DTR-65 fuses and fuse locations.

F1	24 VDC input power
F2, F3	100-240 VAC input power
F4	24 VDC into the main board

All fuses are 2.5A fast blow, 250 V. Recommended fuse part numbers are listed on page 8-1 (Specifications).

continued

Fuse replacement

continued

4. After replacement of any bad fuses, carefully slide the board assembly back into the enclosure.
5. Install the four pan head screws into the corners of the back panel and tighten.
6. Re-install the DTR-65 into the panel using the panel mount jacks, gasket, and set screws.

DTR-65 Re-assembly (if pulled out too far)

If the board assembly is pulled all the way out of the enclosure, follow these steps to reinstall it without damaging any components.

1. Install the board assembly into the enclosure on the second groove from the bottom.
2. Slide the board assembly in until the keypad cable is just flush with the back of the enclosure.
3. Use a small screwdriver to pull the cable so it makes a loop over the top of the header P105 on the main board.
4. Carefully slide the board assembly the rest of the way into the enclosure.

continued

DTR-65 Assembly

continued

Notice – Failure to loop the keypad cable over header P105 will result in the keypad cable being compressed between the main board and the front panel. This may put excessive strain on the keypad cable ZIF connector and result is loss of keypad response.

Figure 10. Re-assembly of DTR-65 boards into the enclosure.

7-1 TROUBLESHOOTING

Fault description	Probable cause	Solution	Reference
Er 10 at power-up	Sensor White (S+) or Black (S-) wire disconnected	Check sensor wiring.	Figure 3. DTR-65 wiring
Er 11 at powr-up	Sensor Red (P+) wire disconnected	Check sensor wiring.	Figure 3. DTR-65 wiring
Er 12 at power-up	Sensor Green (P-) wire disconnected	Check sensor wiring.	Figure 3. DTR-65 wiring
Er 13 at power-up	Sensor Failure or other mis-wiring error Example: Green and White wire swapped, etc.	Check sensor wiring.	Figure 3. DTR-65 wiring
Display not lighted	No power	Check power wiring	Figure 3. DTR-65 wiring
	Fuse(s) blown	Check fuse(s) in DTR-65.	Fuse ratings in Specifications; p. 8-1 Fuse Replacement; p. 6-1
Analog outputs not changing with the displayed tension	Analog output shorted	Check Analog output wiring.	Figure 3. DTR-65 wiring
	Analog output range misconfigured	Check parameters P.06 through P0.11.	--
	Analog output not calibrated	Perform output calibration CAL0.	--
Alarm output not working	Alarm not wired correctly	Check alarm wiring.	Figure 3. DTR-65 wiring
	Alarm not configured correctly	Check parameters P.13 through P.18	--
Remote zero not zeroing tension	Remote zero input not wired correctly	Check remote zero wiring.	Figure 3. DTR-65 wiring
	Digital input threshold level not set correctly	Check parameter P.12	--
Displayed tension is reading negative value with increasing tension.	Tension polarity is wrong	Check parameter P.20.	--
Cannot change parameters or perform calibration.	Password protection is active	Enter the password into P.00 to unlock the DTR-65. The master unlock password is 6195.	--

General

Power	–	100-240 VAC +/-10%, 50-60 Hz, 0.09 A or 24 VDC +/-10%, 0.14 A maximum
		Note that the 24 VDC negative supply and earth ground are interconnected. The 24VDC power supply must have an SELV output, such as Puls ML15.241, Mean Well MDR-20-24 or equivalent. The Mean Well MDR-20-24 can be purchased from Fife as part number 93157-024.
Internal fuses	–	2.5 A, fast-blow Bussman GBD2.50, or Littelfuse 21702.5
Temperature range		
Operating	–	DC supply: 0° to 50°C (32° to 122°F) AC supply: 0° to 45°C (32° to 113°F)
Storage	–	-20° to 80°C (-4° to 176°F)
Enclosure	–	IP65 on front panel IP20 on back and sides
Panel Thickness Range	–	2.54 [0.100] minimum, 9.53 [0.375] maximum
Panel Cut-Out	–	92 x 45 [3.62 x 1.77]
Climatic class	–	3K3 (EN60721)
Relative humidity	–	5% to 85%
Pollution degree	–	2 (IEC664-1)
Dimensions	–	Height – 51.6 mm (2.03 in) Width – 98.4 mm (2.76 in) Length – 172 mm (6.77 in)
Display	–	4-digit LED, 3-digit tension resolution
Display decimal point	–	selectable position
Maximum gain	–	32:1
Tare Adjustment	–	90% of Load Cell Rating

Inputs and outputs

Load cell excitation	-	5 VDC or 7.5 VDC, 100 mA Maximum
Load cell sensitivity	-	1.5 to 100 mV/V
0-10V analog output	-	0 to 10 VDC, 2k minimum load
4-20mA analog output	-	4 to 20 mADC, 450 ohm maximum load
0-1mA or 0-10V analog output	-	0 to 1 mADC, 1k maximum load 0 to10 VDC, open circuit
Alarm output	-	30 VDC maximum, 0.4 ADC maximum, 40 VDC isolation
Digital input (zero tension)	-	24 VDC maximum, 5V or 24V selectable threshold

Temperature drift

Tension display	-	Max null drift: 0.02% of load cell rating per °C
0 to 10V output	-	Max null drift: 0.02% of load cell rating per °C
4 to 20mA output	-	Max null drift: 0.02% of load cell rating per °C
0 to 1mA / 0 to 10V output	-	Max null drift: 0.07% of load cell rating per °C

Certifications and environmental compatibility

Product certifications	-	CE TUV Rheinland of North America to UL61010-1 and CAN/CSA-C22.2 No. 61010-1 and CB Certificate to IEC61010-1 RoHS

Service requests and replacement parts

To request service or to get replacement parts, contact one of the following addresses or your regional office listed at the bottom of this page.

Fife
222 West Memorial Rd.
Oklahoma City, OK, 73114
USA
Phone: 1.405.755.1600
Fax: 1.405.755.8425
Web: www.maxcessintl.com

Fife-Tidland GmbH
Max-Planck-Strasse 8
65779 Kelkheim
Deutschland
Telefon: +49.6195.7002.0
Fax: +49.6195.7002.933
Web: www.maxcess.eu

When ordering replacement parts, please indicate, where possible, part number, drawing number and model description.

If it is necessary to return the DTR-65 for service, care must be taken to properly package the unit to prevent damage during shipment. If possible, use the original shipping containers.

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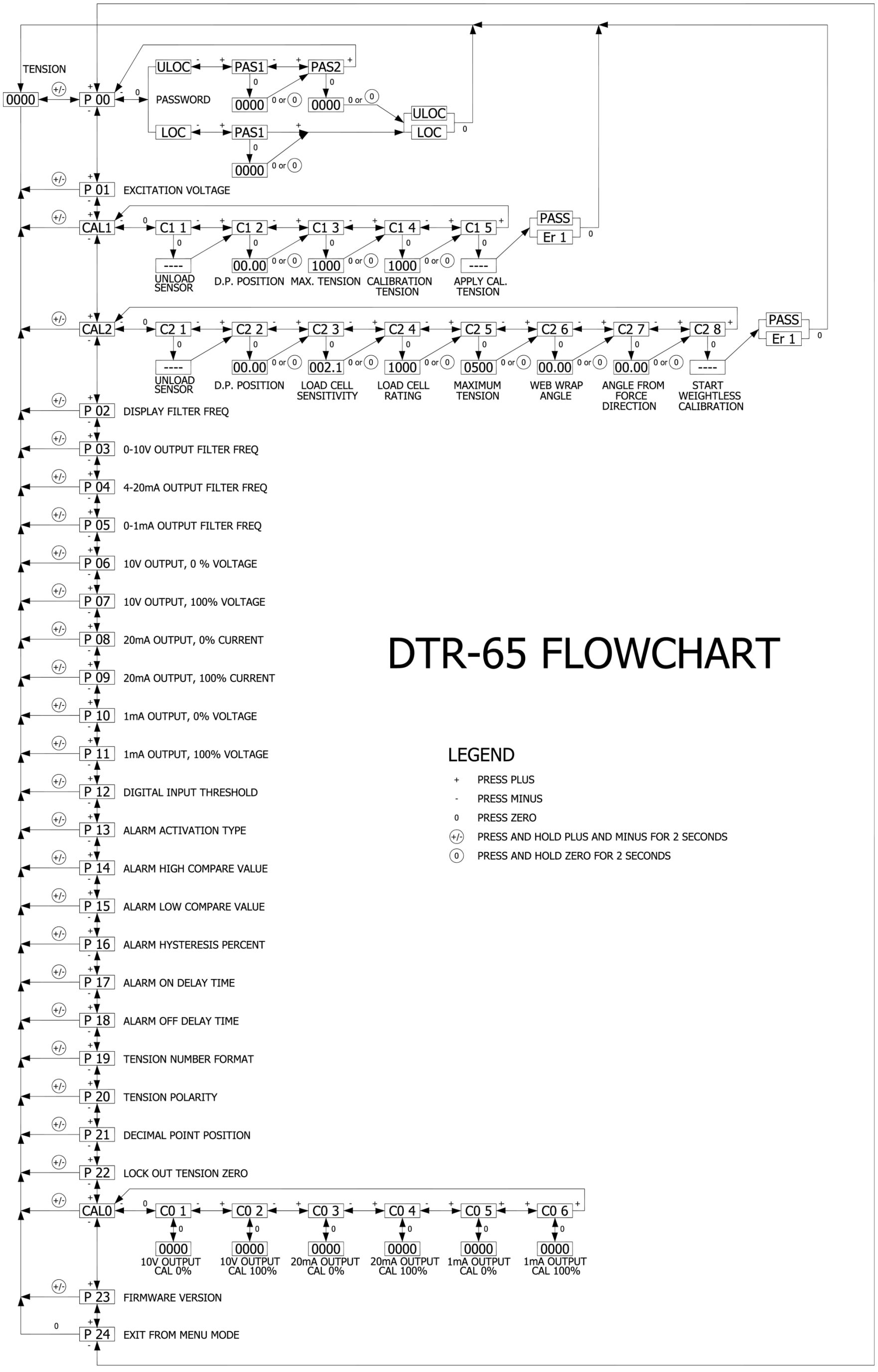
DTR-65 Flowchart



DTR-65 FLOWCHART

LEGEND

+	PRESS PLUS
-	PRESS MINUS
0	PRESS ZERO
+/-	PRESS AND HOLD PLUS AND MINUS FOR 2 SECONDS
0	PRESS AND HOLD ZERO FOR 2 SECONDS